EEE P802.11
Wireless LANs

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| TGax Power Save Calibration Scenario |
| Date: November 6, 2014 |
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# Abstract

This document describes the calibration scenario for power save and power save related operation parameters. The submission provides operation parameters for power save and describes the calibration scenario.

## Common Power Model Parameters for all simulation Scenarios

*Instructions to Editor: Make the following changes:*

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| **~~Power State parameters~~** |
| ~~Power State~~ | ~~Average Power Consumption (mW)~~~~Bandwidth = { 20 MHz }, Band = { 2.4 GHz, 5 GHz }, NSS = { 1 },~~~~Number of TX/RX antennas = { 1 }, TX power per antenna = { 15 dBm }~~ |
| ~~Transmit~~ |  |
| ~~Receive~~ |  |
| ~~Listen~~ |  |
| ~~Sleep~~ |  |

**Voltage = 1.1 V**, Bandwidth = { 20 MHz }, Band = { 2.4 GHz, 5 GHz }, NSS = { 1 }, Number of TX/RX antennas = { 1 }, TX power per antenna = { 15 dBm }

Table 1 – Current consumption in each Power State

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| --- | --- |
| **Power State** | **Average Current Consumption [mA]** |
| **Transmit [mA]** | **280** |
| **Receive [mA]** | **100** |
| **Listen [mA]** | **50** |
| **Sleep [mA]** | **0.003** |

Transmit power state is defined as the state when the STA is sending a PPDU.

Receive power state is defined as the state when the STA is receiving a PPDU.

Listen power state is defined as the state when the STA is performing CCA or actively looking for the presence of a PPDU.

Sleep power state is defined as the state when the STA is in Doze state and receiver is off.

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| **~~Power Transition parameters~~** |
| ~~State Transitions~~ | ~~Transition Time (ms)~~ | ~~Average Power Consumption (mW)~~ |
| ~~Transmit ⬄ Listen~~ | ~~0~~ | ~~0~~ |
| ~~Receive ⬄ Listen~~ | ~~0~~ | ~~0~~ |
| ~~Receive Transmit~~ | ~~T~~~~RT~~ ~~(e.g. SIFS of 16us)~~ | ~~P~~~~RT~~ |
| ~~Transmit  Sleep~~ | ~~T~~~~TS~~ | ~~P~~~~TS~~ |
| ~~Receive  Sleep~~ | ~~T~~~~RS~~ | ~~P~~~~RS~~ |
| ~~Listen ⬄ Sleep~~ | ~~T~~~~LS~~ | ~~P~~~~LS~~ |

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| Power Save Mechanism parameters |
| Mechanism | Parameter | Definition/Values | Pick one value from the Suggested Set of Simulation Values \*\* |
| Power save mode (PSM) | Beacon Interval (BI) | 100 TU | 100 TU |
| DTIM | Integer in unit of BI | { 1, 3 } |
| PSM timeout  | Length of time before STA goes to sleep  | { 50, 100, 200 } ms |
| Power save polling (PSP) | Beacon Interval | 100 TU | 100 TU |
| DTIM | Integer in unit of BI | { 1, 3 } |
| Unscheduled automatic power save delivery (U-APSD) | Beacon Interval | 100 TU | 100 TU |
| DTIM | Integer in unit of BI | { 1, 3 } |
| Max SP Length | Indicate the maximum number of buffered MSDUs, A-MSDUs, and MMPDUs that AP may deliver per SP | { 2, 4, 6, ∞ } |
| AC ~~\*\*\*~~ | Access Category | All ACs are both delivery and trigger enabled~~{ VI, VO, BE, BK }~~ |

\*\* Simulation results presented should clearly indicated what values are used in the generating the simulation results

 ~~\*\*\* If U-APSD is enabled for an AC, then that AC is assumed to be both delivery and trigger enabled~~

## Test 5: Power Save Mechanism Test

*Instructions to Editor: Make the following changes:*

Goal:

This test case is intended to verify the baseline power save mechanism implemented in MAC system simulator

Assumptions:

* PER = 0

PSM test:



Figure 11 – Example of the frameflow in PSM scenario and non-AP STA Power States.

MSDU length: 1500 bytes with CWmin=15  downlink every 200 ms

•RTS/CTS [ OFF ]

•MCS = [ 0 ]

•No A-MPDU aggregation

•DTIM = [ 3 ]

•PSM timeout = [ 100 ] ms

**PSP test:**



Figure 12 – Example of the frameflow in PSP scenario and non-AP STA Power States.

MSDU length: 1500 bytes with CWmin=15  downlink every 200 ms

•RTS/CTS [ OFF ]

•MCS = [ 0 ]

•No A-MPDU aggregation

•DTIM = [ 3 ]

**U-APSD test**



Figure 13 – Example of the frameflow in U-APSD scenario and non-AP STA Power States.

* U-APSD test MSDU length: 120 bytes with CWmin=15  (assuming 24 kbps codec, once every 40 ms) for both AP and STA

~~Power save test parameters~~

* ~~MSDU length: [ 120 bytes with CWmin=7  (assuming 24 kbps codec, once every 40 ms) for both AP and STA, 1500 bytes with CWmin=15  downlink every 200 ms ]~~
* RTS/CTS [ OFF ]
* MCS = [ 0 ]
* ~~Power model = [ PSM, PSP, U-APSD ]~~
* DTIM = [ 3 ], STA may not receive Beacons for TIM
* Max SP Length = [ 4 ]
* All ACs are trig ered and delivery enabled
* ~~PSM timeout = [ 100 ] ms~~

Output:

* MAC throughput
* ~~Per STA energy per TX bit~~
* ~~Per STA energy per RX bit~~
* Pie chart (breakdown) of time spent in each power state during the course of the simulation
* Pie chart (breakdown) of energy consumed in each power state during the course of the simulation